

Fig. 1.—Preoperative x-ray of the stomach.

Fig. 2.—Postoperative x-ray of the stomach after resection. (This x-ray was taken after ingestion of the meal. This explains the flocculency and uneven distribution of the barium in the upper portion of the stomach.)

Physical Examination.—Patient is a well-developed, but poorly nourished young woman who appears to have lost considerable weight. The skin is sallow and suggests cachexia. The general physical examination is otherwise negative.

Local Examination.—In the center of the right breast an indurated mass the size of a golf ball can be felt. The newgrowth is slightly movable; its borders are diffuse and adherent to the deeper tissues, but not to the skin. Several glands, varying in size from a bean to a cherry, were felt in the axilla. Biopsy was done, and a small piece removed from the breast. The following is the report by Dr. Timothy Leary, professor of pathology at Tufts Medical College:

“Received nodule from breast in formalin solution. Microscopic examination: Nodule is made up of large spaces lined by multiple rows of epithelial cells surrounding a more or less central lumen. In some, lumen is filled with proliferating cells. Mitotic figures are found with little difficulty. The epithelial proliferation is not limited by basement membrane. The supporting connective tissue stroma is cellular, abundant, and shows a scattered lymphocyte infiltration. Diagnosis: Duct carcinoma of breast.”

Operation was performed on November 9, 1926. Through a modified Rodman incision, the breast and pectoral muscles were removed en masse. The operation began with an extensive dissection of the axilla, working downward. Two enlarged glands were found in the infraclavicular region and removed. Skin approximated with slight tension. Patient made an uneventful recovery.

On March 1928, patient presented herself again, complaining of vomiting after meals and inability to retain even fluids. Physical examination showed patient greatly emaciated. The scar of the last operation is clear, right arm shows no swelling, is freely movable, and no masses are felt in the axilla. Abdomen shows a mass the size of a large grapefruit in the region of the epigastrium. The growth is freely movable, somewhat painful to touch, indurated and sharply outlined. X-ray examination of the stomach shows an extensive carcinoma of the pyloric end, involving a part of the anterior wall and the greater portion of the posterior wall. X-ray of the chest shows no evidence of metastasis.

Operation.—Abdomen opened under ether anesthesia. The pyloric end and most of the posterior wall of the stomach were involved by the newgrowth. The neoplasm was confined to the stomach itself. No ad-

hesions to any of the adjacent viscera were present. The liver was normal in size, surface was smooth and, as far as could be judged, was free from metastasis. Several enlarged glands were felt in the greater omentum and around the pylorus. Resection of the stomach including almost the entire posterior wall, following the Polya technique, was done. Patient left the operating table in very good condition (pulse about 76). Recovery was uneventful. Pathological report of specimen of the stomach by Doctor Leary is as follows:

“Received 10.5 centimeters of pyloric end of stomach. Beginning at pylorus and involving the whole of posterior wall is a diffuse, firm neoplasm which measures up to 2.5 centimeters in thickness; the overlying mucosa is deep red, apparently intact. Specimen preserved in gross except for thin slices from edge for microscopic examination. This shows a neoplasm made up of large alveolar masses

of epithelial cells with little tendency to gland formation. Mitotic figures are readily found. Diagnosis: Diffuse carcinoma of stomach.”

COMMENT

In view of the fact that the x-ray showed no existence of metastatic involvement of the chest, it is reasonable to assume that the malignancy of the stomach was primary in character.

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A CLOSED METHOD FOR THE TRANSFUSION OF CITRATED BLOOD

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IT is our purpose to present here a method for the transfusion of citrated blood, by means of which the blood is always in a closed system and is never exposed to contamination from external sources. No brief is presented in favor of the citrate method as against direct blood transfusion, as it is our belief that more or less definite indications exist which should determine the choice of the method to be used. However, when the citrate method is employed, the technique described here will be found simple, uniformly applicable, and a refinement on the common methods.

The usual procedures for the transfusion of citrate blood involve one or more of the following exposures of the blood to the open air:

1. Blood is collected into an open container where it is mixed with the citrate solution by shaking or stirring.
2. The citrated blood is filtered by pouring through an open filter.
3. Occasionally the filtered blood is again transferred to another open vessel before being injected into the recipient.

In order to avoid the dangers incident to exposure the following apparatus and technique were devised.

APPARATUS AND TECHNIQUE

A thousand cubic centimeter Erlenmeyer flask graduated with 100 cubic centimeter marks is fitted with a rubber stopper through which pass two pieces of glass tubing. Between the neck of the flask, and completely surrounding that portion of the rubber stopper within the flask, is placed a single layer of fine-meshed gauze. The stopper and gauze are first moistened in sterile citrate solution and then securely fastened into the flask by means of tape tied over the top of the stopper and around the neck of the flask. Thus when the flask is inverted, even when filled with blood, the stopper remains in place. The longer or intake tube perforates the gauze and extends to within about 4 centimeters of the bottom of the flask. The shorter, or outlet tube, is flush with the inner surface of the rubber stopper and is directly covered by the layer of gauze. A piece of rubber tubing, about one foot in length, connects the intake tube to the needle which is to be inserted into the donor's arm. The junction of this tubing and the needle is secured through a right-angled metal adapter 2 centimeters in length. Care is taken to see that all metal and glass ends are absolutely smooth. Lindemann needles have been found most advantageous for both donor and recipient. A rubber suction bulb is attached to the outlet tube. The needle is now placed in citrate solution and 15 to 20 cubic centimeters of the solution are drawn through the apparatus. The rubber intake tubing is then removed and is replaced by the bulb which now acts so as to transmit pressure into the system. Similar rubber tubing, adapter, and needle are now connected to the outlet tube, the flask inverted and the citrate solution forced through the outlet system. Thus the entire inside of all portions of the apparatus have been moistened with citrate solution (Fig. 1).

The apparatus is once again set up for drawing fluid into the flask. Fifty cubic centimeters (or any desirable amount) of a 2½ per cent solution of sodium citrate are then drawn into the flask. The operator inserts the needle into the donor's vein in the usual manner and connects it to the system by means of the adaptor. He continues to hold the needle and the adaptor firmly in position. An assistant exerts light pressure on

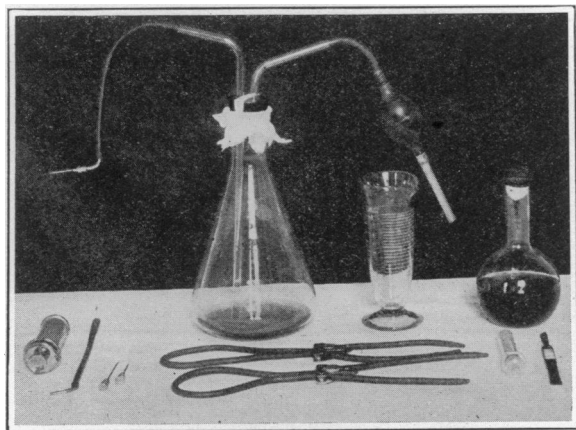


Fig. 1.—Apparatus required for the method described in the text

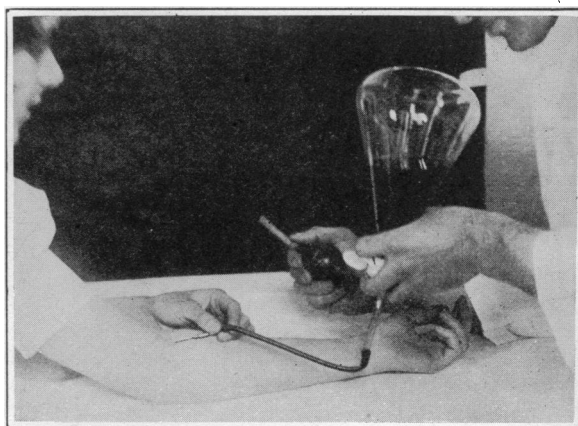


Fig. 2.—Semidiagrammatic representation of introduction of citrated blood into the recipient's vein

the suction bulb and gently shakes the flask as the blood flows in. (The flask should preferably be held below the level of the donor's arm.) When a sufficient quantity of blood has been collected the needle is removed from the donor's arm and the apparatus is set up once again as a pressure apparatus to deliver blood through the outlet tube. (See Fig. 2.) A needle is now inserted into the recipient's vein and connected by an adaptor to the outlet tubing. The assistant inverts the flask and by gentle pressure on the bulb forces the blood into the recipient's vein at any desired rate. Usually an average of one minute is allowed for the entrance of each 100 cubic centimeters of blood transfused.

All portions of the apparatus, including the bulb, are sterilized by boiling or steam pressure.

ADVANTAGES OF THE METHOD

Since the blood is in a closed container, it is readily transported from donor to recipient whether they are in the same or distant rooms. When the blood is immediately transferred to the recipient, it has not been found necessary to use any artificial means to keep the blood warm. On the other hand, if a period of time is to elapse between the collection of the blood and its introduction into the recipient, the blood may be kept warm by immersing the flask in a water bath, or by surrounding it with a hot towel.

Because of the suction and pressure feature of the apparatus, the automatic filtering mechanism, and the fact that the blood is not transferred from one vessel to another, makes a more efficient and rapid method of citrate blood transfusion than the usual ones.

SUMMARY AND CONCLUSIONS

1. A closed method of citrated blood transfusion has been presented.
2. In our hands the method has proved efficient, safe, and rapid.
3. The method allows for the collection, transportation, and introduction of the citrated blood from the donor to the recipient.
4. Being a closed method, the usual dangers of contamination are minimized.

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